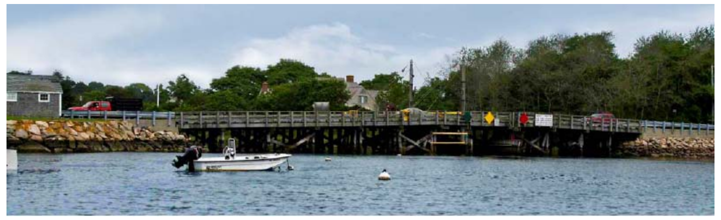
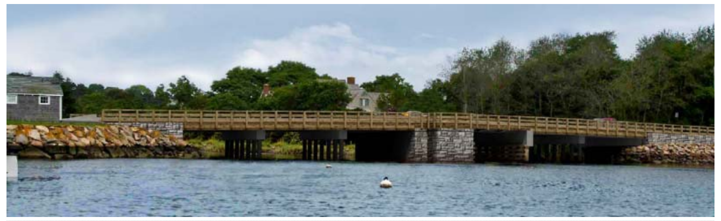
ABP Context Sensitive Solutions

Preserving Scenic Value & Improving Safety in Chatham



Existing conditions, Mitchell River Bridge



Proposed design alternative, Mitchell River Bridge

The Mitchell River Bridge carries Bridge Street over the Mitchell River in the quaint seaside community of Chatham. Frequented by residents and tourists, the community has voiced the need for safe areas for cyclists and pedestrians and increased clearance for the area's many boaters. The community values the existing bridge's charming looks and would like to see extensive use of stone and timber to replicate the feel of the existing bridge as much as possible.

The ABP has worked with its design consultant to develop plans for a bridge that will have cyclist-friendly shoulders and ADA-compliant sidewalks protected by a crash-tested rail; that will open fully to allow boat passage; and that will incorporate timber and stone wherever possible.

The historic status of the existing bridge is currently being reconsidered at the national level. The ABP will adjust its approach accordingly.

ABP Restores & Reopens Historic Bridge After Nearly 16 Years of Closure— Maple Street, Chester

Last month, MassDOT reopened the historic Maple Street truss bridge across the West Branch of the Westfield River for the first time in almost sixteen years. The complete rehabilitation and careful restoration of the bridge is one of the Accelerated Bridge Program's first-year projects.

The ABP project team determined that restoring the truss structure— a community desire— would fulfill the interests of the stakeholders and meet structural needs.

The historic structure required special treatment. MassDOT's contractor, Northern Construction Services, dismantled the bridge and sent individual members off-site to be restored. The pieces that were able to be restored were reused. The remainder of the pieces were replicated down to their rivets. In fact, rivet-faced bolts were added to the beams so that the new structural members would be indistinguishable from the originals.

The new bridge enables easier travel within the community, enjoyment of a scenic river view, and preserves a historic jewel for many decades.

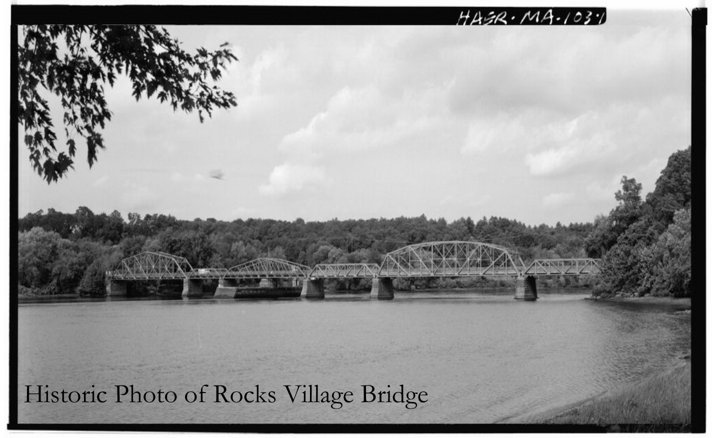
The Maple Street Bridge in Chester.
Above: Elevation view
At left: Truss with false rivets
At right: Crash-tested rail and restored historic railing

June, 2010 Accelerated Bridge Program

ABP Context Sensitive Solutions

> *The Accelerated Bridge Program defines success as providing a bridge that satisfies the project purpose and fulfills community aspirations.*

Preserving the Historic Value of the Rocks Village Bridge, Haverhill—West Newbury



Historic Photo of Rocks Village Bridge

Located across the scenic Merrimack River, the Rocks Village Bridge connects the communities of Haverhill and West Newbury, not only to each other, but to a shared past.

The six-span Rocks Village Bridge is a unique structure, characterized by its five different types of truss. It is the last hand operated swing bridge in Massachusetts and the oldest known swing bridge in the country. It was built by the Boston Bridge Company in 1883.

The goal of this project is to rehabilitate the bridge so that it will no longer be structurally deficient and so it will be capable of carrying statutory loads, since the bridge currently has posted weight restrictions. This work will include reinforcing structural elements such as floor beams and gusset plates, replace the severely deteriorated swing span operating machinery, and add a braking system to the machinery for safety.

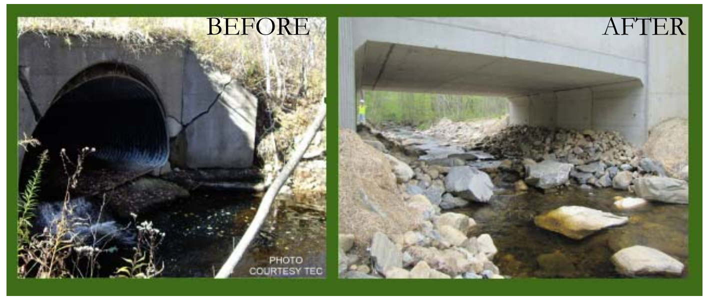
The ABP is meeting the community goals of preserving the historic aesthetic and operation of the bridge by thoughtful material selection. Fiber-reinforced polymer decking was selected for its light weight, decreasing dead load and increasing live load capacity. It will be tinted so that it has the appearance of wood to the boating traffic beneath the bridge. Metal will be used to best replicate other structural elements. The operating machinery will be replicated— specially machined to look like the existing machinery. The bridge will continue to be operated by hand. Gusset plates and floor beams will be reinforced as necessary to strengthen the bridge. Rivet-faced bolts will be used so that all structural elements will look as historic as the originals.

Restoring Habitat and Function in the Berkshires

This May, line striping was added to McInerney Road where it crosses Shaker Mill brook— the final touch to a very successful bridge replacement project in Chester.

The ABP was pleased to have an opportunity to restore use of the bridge to road users and passage under the bridge for wildlife, especially in Located in an area that values its natural resources and outdoor recreation.

Thanks to multi-agency cooperation, MassDOT was able to widen the bridge's span and restore the stream to natural conditions which provide great habitat for the brook's native cold-water fish. Native stones and plants were used to create the diverse conditions needed for healthy wildlife habitat. The resident engineer for the project has already seen fish in the brook.



To top it off, the bridge was reopened to traffic one month ahead of schedule.

Promoting Partnerships & Balancing Competing Needs— Burns Bridge, Shrewsbury-Worcester

Early on in the Burns Bridge (Rte. 9 over Lake Quinsigamond) Replacement Project, the ABP Mega Project team's actions are a testament to the principles of Context Sensitive Solutions. The team has identified a wide range of stakeholders including residents of a 60+ housing complex, a growing university, business owners, an active boating community, commuters, and historically-minded citizens. To gain a complete understanding of the bridge's context and community values, and to promote partnerships, the ABP is establishing relationships with the project stakeholders. The project team has already held six meetings to discuss the project and determine community aspirations. Public information meetings will continue to be held at least quarterly, with special meetings with stakeholder groups between public information meetings.

The ABP has also established an exceptional multi-disciplinary team, including famed architect, author and instructor Fred Gottemoeller, famed for his expertise in bridge aesthetics and context-sensitive designs. The team, in its type study, is establishing a vision for the replacement bridge that will enhance community benefits of the bridge. The vision being developed aims to meet the project's structural goals and community interests, all of which are listed below.

Principles of Context Sensitive Solutions

- Strive towards a shared stakeholder vision to provide a basis for decisions
- Demonstrate a comprehensive understanding of contexts
- Foster continuing communication and collaboration to achieve consensus
- Exercise flexibility and creativity to shape effective transportation solutions, while preserving and enhancing community and natural environments

Burns Bridge Project Goals & Community Aspirations:

1. Provide a structurally-sound bridge with a design life of at least 75 years
2. Provide a bridge that can be used safely by all
3. Increase structural capacity
4. Respect area's historic nature
5. Respect the environment
6. Increase safety and space for cyclists and pedestrians, especially increasing accommodations on the Worcester side of the bridge and for the elderly
7. Provide observation areas for viewing racing events and scenery
8. Provide a bridge that will be capable of handling the traffic resulting from future growth, including economic growth and the expansion of UMass
9. Increase safety and ease of passage for marine use.
10. Provide aesthetically pleasing structure that respects its surroundings
11. Maintain access to businesses during construction
12. Shorten the construction duration to reduce community impacts
13. Maintain adequate lanes for travel while bridge is being constructed, during peak hours and off-peak hours

Burns Bridge Project Design Alternatives are Developed to Meet Goals & Aspirations

The ABP's Burns Bridge team is planning to provide a bridge that meets all the goals and aspirations listed above. Renderings, such as those shown at right, and conceptual type study drawings illustrate the different ways that many goals can be achieved.

The new bridge will, of course, be structurally sound and designed to last at least 75 years. It will accommodate future growth by adding one lane in each direction. It will be pedestrian and cyclist-friendly. It will accommodate users of all abilities and greatly improve the area's pedestrian accessibility.

It will be designed and built in a manner that respects the environment. For recreation, it will have observation areas for viewing the river's many competitive boating events and the scenery. The bridge will be more boater-friendly by increasing horizontal and vertical clearance.

The various design alternatives are being developed with respect for the community not just after, but during, construction. The project team would like to pursue design alternatives that will have minimal construction impacts.

Fusing Function & Aesthetics— Fore River Bridge, Quincy-Weymouth

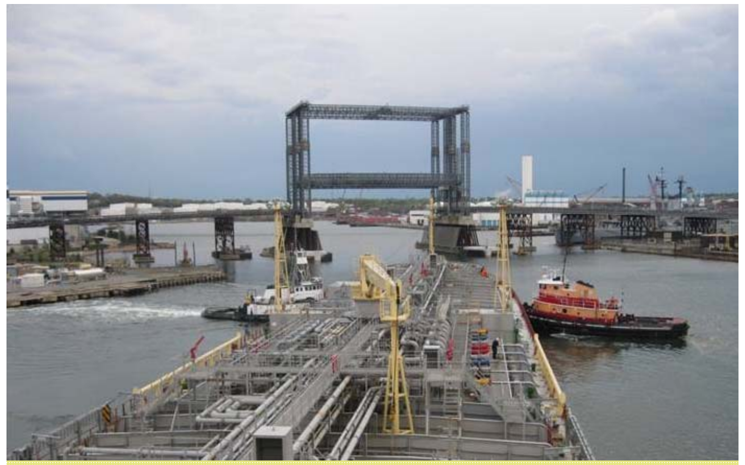
The ABP team is working hard to develop a bridge project which supports the many modes of transportation that heavily use the crossing of Washington Street/Route 3A and the Fore River in Quincy-Weymouth. The team is also hoping to protect the nearby neighborhoods' quality of life by providing an aesthetically-pleasing and quiet bridge.

Stakeholders for this project can be divided into a handful of categories: nearby residents, cyclists/pedestrians, commuters, recreational boaters, and commercial shipping industry/port users. The bridge has a high AADT— it carries 30,000 vehicles per day. Its vertical lift span opens nearly 600 times every year and currently takes twenty-one minutes to open and close. A large number of commercial ships pass beneath the bridge, currently slowly navigating a very tight passage. Area residents are disturbed by the noise created by the bridge's open grate deck. Commuters and other bridge users are disturbed by the numerous and long bridge openings.

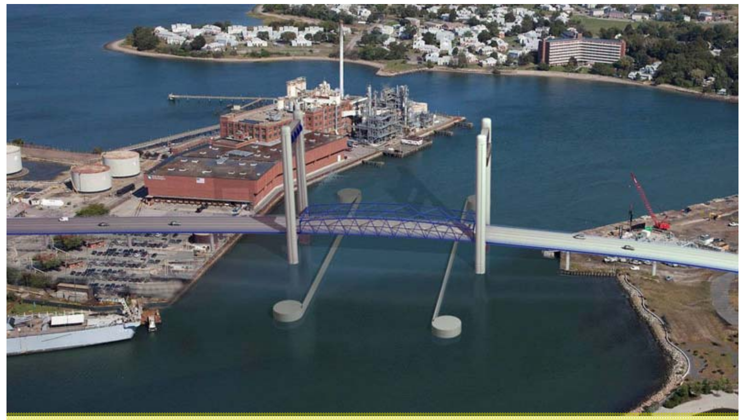
Given the issues with the existing bridge, the community aspirations identified by the ABP during its twelve meetings with members of the public are not surprising. They include: reducing the number and duration of bridge openings, decreasing road noise, limiting noise during construction, providing safe spaces for pedestrians and cyclists, and providing passage for the busy, designated port area. In addition to these goals, the community has strongly voiced its desire for the bridge's aesthetics to respect the nearby neighborhoods.

The multi-disciplinary project team's philosophy is based on collaboration, directed communication and the goal of a unified, integrated vision. Fortunately, the primary transportation interests overlap. For example, bridge users want fewer and shorter openings. The boating community wants easier passage. Both of these can be accomplished by increasing vertical and horizontal clearance. In addition, reducing road noise is a simple as selecting a concrete wearing surface.

To aid in providing a very large highway bridge to meet functional transportation needs while being in harmony with nearby residences, the ABP is working with architect Miguel Rosales who is an award-winning specialist in context sensitive bridge design and the architect for the Zakim Bridge. During meetings with the community, the ABP has informed the public that a vertical lift structure is the best functioning design alternative. Although we are not able to replicate the prior bascule bridge, the vertical lift better meets the very important infrastructure needs and will best reduce the number and duration of lane closures. The project team is collaborating with residents to define the community's aesthetic goals and apply them within the constraints of the infrastructure needs. Mr. Rosales is currently creating renderings of a proposed bridge alternative which includes art deco details and cladding that the community would like to see. The new renderings will be presented for public information and comment on June 14, 2010.

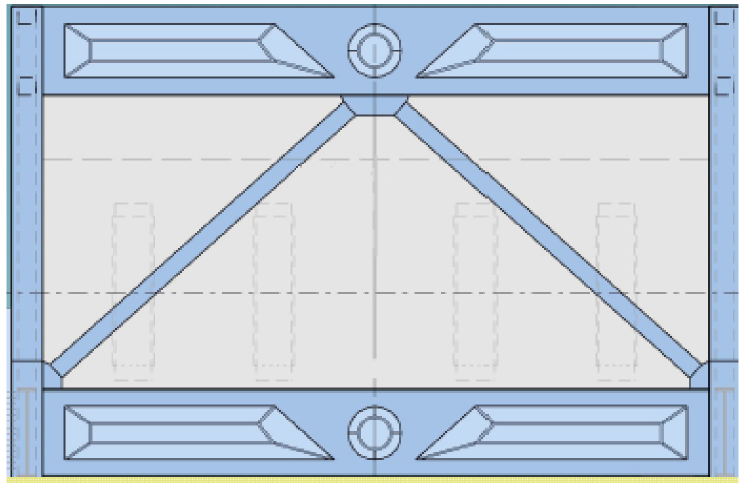


The existing bridge that carries Washington Street/Rte 3A over the Fore River



An early conceptual rendering of a replacement vertical lift bridge. Revised renderings incorporating the public's aesthetic goals will be presented on 6/14/2010

> *The project team is collaborating with residents to define aesthetic goals and apply them within the constraints of infrastructure needs.*



Art deco details under consideration